NREL In Focus

Bill Glover Is New NREL Deputy Director and COO

PIX14712/Mike Linenberger

Deputy Director and Chief Operating Officer Bill Glover

On February 1, 2006,NREL welcomed William (Bill) Glover as the Laboratory's new Deputy Director and Chief Operating Officer. "I'm glad to be here," he said. "I'm very excited about the Lab's mission and I am looking forward to working with everyone at NREL."

Bill has had more than 35 years of executive-level experience. His extensive experience with the Department of Energy (DOE) has included senior management responsibilities in standards identification and management, self-assessment and independent oversight, quality assurance, performance measurement and evaluation, and readiness reviews. He was on a headquarters level group overseeing the rollout of DOE's Standards Program, and he led a facilities maintenance program assessment team at Los Alamos National Laboratory.

Before joining NREL, Bill was an independent consultant, President/General Manager of TENERA Federal Services LLC, and Director of Performance Assurance with EG&G, Rocky Flats. He served with distinction for 26 years in the United States Navy, including managing a nuclear submarine squadron with more than 3,500 personnel.

Bill has a B.A. in chemistry from the University of Rochester and the equivalent of an M.S. in nuclear engineering (from the Navy Senior Officer Nuclear Power Training).

As Chief Operating Officer, Bill will oversee Laboratory operations. As Deputy Director, he will support the development and implementation of the Laboratory's operational strategic vision. He will also serve as a vice president for Midwest Research Institute, which has operated and managed NREL for DOE since NREL opened as the Solar Energy Research Institute in 1977.

New Colorado Research Partnership Formed to Develop Fuel Cells

Power generation in the 21st Century faces some tough challenges: it has to score very high in energy efficiency and, at the same time, very low in environmental impacts. Right now, the fuel cell is one of the few technologies that appears to do both these things at once.

PIX14679/Ray David

The new joint-venture Colorado Fuel Cell Center is housed at the Colorado School of Mines a few miles away from the NREL campus.

So, to help bring advanced fuel cell technologies to the marketplace, NREL has formed a partnership with the Gas Technology Institute, the Colorado School of Mines (CSM), and Versa Power Systems. Their joint venture, known as the Colorado Fuel Cell Center (CFCC), is focusing on fuel cell research, development, testing, and commercialization in a state that is home to several related high-tech industries.

The new center is housed in the General Research Laboratory at the Colorado School of Mines in Golden. The Colorado Governor's Office of Energy Management and Conservation has provided $2 million in start-up funding, and the partners are contributing $1 million. The CFCC aims to provide state leadership in the development and application of fuel cell technologies, increase the public's understanding of the technologies through education and outreach activities, and foster economic development through partnerships with local businesses.

The CFCC will also coordinate the development of fuel cell R&D programs, facilitate access to experts in NREL and CSM research labs, assist in forming strategic alliances among local developers and university research centers, and serve as an independent testing agency. In addition, the center will promote the development of fuel cell curriculums in colleges, universities, and trade schools in order to build a technically viable labor force for this young industry.

The tremendous growth expected in the fuel cell industry in the coming decade will mean new high-tech jobs in R&D and in manufacturing that will eventually extend well beyond Colorado and the industry itself.

At the end of two years, the CFCC should be self-sustaining through research and development contracts, consulting agreements, and other sources of funding. The center will then emphasize the development of the Colorado fuel cell industry as it responds to national solicitations. For more information, contact CFCC Executive Director Robert J. Remick, rremick@mines.edu.

NREL Computing Power Surpasses Teraflop

NREL's high-performance computing capability recently surpassed the peak-performance mark of 1 teraflop—or one trillion floating point operations per second. "We've gone from 96 gigaflops of power to 1.2 teraflops in less than four years," said Steve Hammond, director of NREL's Computational Sciences Center (CSC), highlighting this significant milestone in building high-performance computing expertise and capabilities at the Laboratory.

PIX14651/Mike Linenberger

This increase in high-performance computing capability greatly aids scientific pursuits. For example, researchers in the Buildings & Thermal Systems Center have run computational fluid dynamics models of their novel patent-pending tab-fin heat exchanger without building expensive, time-consuming prototypes. Simulations help optimize the geometry by considering numerous different tab sizes and placements, leading to a design with the best performance.

Scientists in the National Bioenergy Center have likewise benefited. By using CSC's quantum mechanical modeling, they have investigated the loss of fermentable sugars during biomass pretreatment. The increased computing capability has been an essential tool for understanding the kinetics of these chemical reactions, which can lead to higher ethanol yields and lower process costs.

Computational science—the process of using computers to model and simulate real-world processes and phenomena—is an indispensable partner with theory and experiment to advance scientific knowledge and engineering practice. The NREL CSC helps researchers study complex systems and natural phenomena that would be too expensive, dangerous, or even impossible to study by direct experiment.

PIX14532/Jack Dempsey

NREL's Computational Sciences capabilities include cutting-edge tools and techniques for stereo 3D analysis and visualization of complex scientific data.

Energy-Efficient Science and Technology Facility Set to Open

NREL is nearly ready to roll out its newest research facility on the South Table Mountain campus in Golden, Colorado. The Science and Technology Facility, or S&TF, is a 71,000-ft^2 (6,596-m^2), multilevel facility dedicated to research and development in solar cells, thin films, nanostructures, hydrogen energy, and fuel cells, which are several of the most important renewable energy technologies highlighted in the Solar America and Hydrogen Initiatives.

The building is designed to increase collaboration among researchers and shorten the time it takes new technologies to move from the laboratory bench to commercial manufacturing—and ultimately, to consumers.

Laboratories and office space are on the facility's ground level. The second level houses additional labs and a large, open Process Development and Integration Laboratory (PDIL). The third level contains mechanical equipment, such as exhaust fans. An elevated bridge connects the S&TF to the Solar Energy Research Facility next door.

The S&TF was especially designed to reduce technical and manufacturing barriers and accelerate the transfer of technology from R&D to industry. The centerpiece of the building will be the PDIL, an 11,400-ft^2 laboratory space specifically designed to accommodate a new class of tools for thin-film deposition, processing, and characterization. Six research bays will be available for industry partners as they scale up processes for early application in manufacturing devices such as PV modules.

Brent Nelson, who is leading the process integration project, says, "The PDIL will give us integrated tools, integrated data, and the added bonus of people with diverse skills working together."

The S&TF also includes laboratories for advanced materials, surface analysis, and novel deposition techniques. A flexible laboratory model guided the design, allowing smaller labs to be combined to form larger, more open ones, as needed. And the building's "interaction spaces" encourage the kind of informal discussions that often lead to R&D breakthroughs and other innovations. Each interaction area features a white board and computer access.

"Going into this project, our emphasis was on designing functional and flexible laboratory space that will meet our research needs both today and in the future," technical project manager Pete Sheldon says.

Like other NREL laboratory facilities, the S&TF is also a model of sustainable design and efficient energy use. It is expected to consume as much as 40% less energy than would a more conventional laboratory building. Daylighting, for example, which is the abundant use of natural light in a building, helps to reduce energy use by minimizing the use of artificial lights—and keeping the facility that much cooler—in the daytime. In the S&TF, natural light through numerous windows and clerestories illuminates the open office areas and even some of the labs. "Our goal was to have 100% daylighting in all office spaces," says Otto Van Geet, an NREL senior project leader.

In addition, energy recovery technologies use exhaust air to preheat or cool supply air. This allows smaller heating and cooling systems to be used. In line with Colorado's dry climate, evaporative cooling is also featured, as well as a raised-floor air distribution system. Overall, the facility has been designed to achieve a "Gold" rating as a U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) building.

Construction of the S&TF began in fall 2004 after designs were completed and contractors selected. Because of the excellent progress made, project managers expect occupancy to begin in July 2006.